

SIPHONAPTERA COLLECTED DURING A VISIT TO THE
EASTERN UNITED STATES OF NORTH AMERICA IN 1927.

By DR. KARL JORDAN.

(With 4 text-figures.)

MY visit to the United States had a threefold object: to attend a meeting of the Organising Committee of the Fourth International Congress of Entomology, to study Fleas in Museums and at large, and to see a little of "Land and Leute" in that renowned country. The visit has been satisfactory in every way, at least to myself, and this could not be otherwise, since I met with the greatest assistance and kindest hospitality everywhere.

My studies in the systematics of the American Siphonaptera had advanced to a point where it became necessary to consult the material of this order of insects contained in American Museums, particularly the United States National Museum at Washington, D.C., where most of the types of the species described by Carl F. Baker are preserved. Some questions of identification and synonymy could not be answered without comparison of the types to which the names concerned applied, and several species not contained in the British Museum collection (inclusive of the collection of N. C. Rothschild) could not be placed correctly in our scheme of classification before we had seen a specimen of each of these species which were known to us only from the descriptions. I spent nearly four weeks at the U. S. Nat. Mus., where I was given every facility to study the numerous types in the flea-collection, my special thanks being due to Dr. Aldrich and Dr. Ewing for the great courtesy and help extended to me. The result of this laboratory work will be published in due time. Besides comparing specimens and drawing details of structure there were several other points of interest for my researches in Siphonaptera. The collection of N. C. Rothschild is fairly rich in species and specimens from the western side of the North American Continent and the Rocky Mountains, while the Eastern States are comparatively poorly represented, even as regards some of the commoner species. Moreover, the records of hosts sometimes left me in doubt as to which species of mammal was the normal host of a particular species of flea. And, further, the distribution of some of the species was likewise puzzling to me. All these points, important for my researches, were ample reason for wishing to collect material of fleas during my stay in the country. My colleagues at Washington to whom I mentioned my desire did not confine themselves to giving me good advice, but took me on excursions into the woods of the Potomac R., where I had a most enjoyable and profitable time. I am particularly grateful to Mr. A. S. Barber, whom I accompanied several times to Plummer's Island, and to Mr. E. A. Preble for giving me hospitality in his cabin below Black Pond on the Virginia side of the Potomac. I do not think I shall ever forget the two nights I spent in the woods of the Potomac where every call of Beast, Bird and Amphibian was strange to me and the flash-lights of the Lampyrids were a most attractive sight. Here I made the acquaintance "in the flesh" of a number of fleas which I knew only from specimens preserved in alcohol or perpetuated in balsam.

The first live example of a species of animal or plant one has studied from dead specimens is always very interesting ; it impresses the mind as being much more real than the preserved material of the laboratory, possessing an additional reality in being alive. Mr. A. Howell told me that I would have to clear the place of *Peromyscus leucopus* before I could expect to get much else in my traps, meaning that the White-footed Mouse was very abundant and easily trapped. In a way I was glad that he was right ; for I soon got this mouse and its nest, and the fleas obtained proved to answer two questions. At home I had not been able to identify from the description a species named by Baker in 1905 *Ceratophyllus leucopus* from a single female taken off *Peromyscus leucopus* ; and here was this identical flea, abundant on the White-footed Mouse. Moreover, an examination of it under the microscope in the Museum proved it to be the same as *Ceratophyllus aeger* Roths. (1905), described from Alberta and since received now and again in a few specimens from various Eastern States. The interest in *C. leucopus* soon flagged, as it is the flea most commonly obtained wherever I trapped for mice during my visit. The first specimen of the Short-tailed Shrew (*Blarina brevicauda*), which I caught in a mole-trap under herbage on the bank of the brook which runs through Mr. E. A. Preble's property, yielded a small series of a flea of which our collection only contained two specimens ; and on *Neotoma pennsylvanica*, which Mr. Preble showed me where to trap, I found, in numbers, an undescribed flea which is of interest as being the Eastern representative of a series of forms known to occur from Colorado west- and northward. Some Pine Mice (*Pitymys pinetorum*) caught on Plummer's Island provided me with a series of specimens of a flea (*Ctenophthalmus pseudagyrtes* Baker 1895) which is usually found on moles, the Pine Mouse being new to me as a host of this flea. That a couple of days more or less haphazard collecting within easy reach from Washington, D.C., should add this much to my knowledge of the Siphonaptera was most encouraging ; but collecting had to remain a very secondary matter during my stay in this city, the visits to the woods being but pleasant incidents interrupting the work at the Museum.

When at Philadelphia, where I enjoyed the hospitality of Professor and Mrs. P. P. Calvert at Cheyney, about an hour's journey from the city, I might have continued the collection if I had known what an ideal place for my purpose Cheyney was. But there was so much on my programme that I had left the traps at Philadelphia, and therefore the only addition to the bag were the fleas of a mole which my hosts caught for me in the garden, the first American Mole (*Scalops aquaticus*) I had seen. There are three species of moles in the Eastern United States, all of which I caught later on in other places. What flea occurs on the most peculiar species of the three, the star-nosed mole, is not known ; the pair I caught at Mt. Kisco, N.Y., had no Ectoparasites. The species lives in swampy ground and possibly has no flea of its own, but much depends on the place where the nest is made, about which I know nothing. The other two species, the Common Mole with naked tail and Brewer's Mole with hairy tail, have the same flea and only this one species. In Europe any locality has only one species of mole, but at least four species of fleas may be expected to occur on it. That is a singular contrast, which justifies the conclusion that the American moles originally had no flea, and that the single species of flea now occurring on them in abundance is a later acquirement. This conclusion is borne out by another consideration : I mentioned above that on the Potomac I obtained the mole-

flea from the Pine Mouse and only this species; at Braewold, Mt. Kisco, N.Y., where I stayed as the guest of Miss Carolena Wood, it was again this mole-flea that I found on the specimens of the Meadow Mouse (*Microtus pennsylvanicus*). We may take it as certain that this American mole-flea has, as normal hosts, several species of mice besides the moles, and as the flea belongs to a genus which is represented by an abundance of species in Africa, Europe and Palae-arctic Asia, only one of which occurs on the European mole, all the others being fleas of rodents, the conclusion is not far-fetched that the American moles received their one species of flea from the mice, not the other way about. Mice frequent the runs of moles; in Europe one of the commonest mouse-fleas (*Ctenophthalmus agyrtes* Heller 1896) is often found on the mole and in its nest, and the frequency of such an association may easily lead to an adaptation of the mouse-flea to the mole, the deciding step in this evolution would be, on the part of the flea, the loss of the aversion to suck the blood of the mole.

The surroundings of Braewold, Mt. Kisco, with its fields, meadows, woods, brooks and vistas of forest-clad hills invite dreams of the time when industry had not yet been introduced, and people were industrious in tilling the soil. The place creates a deep feeling of peace after the bustle of the city. I spent several days under Miss Carolena Wood's most hospitable roof and employed the time in sampling the fauna in the neighbourhood of the house and farm. The English sparrow was very much in evidence, as nearly everywhere in the Eastern States of the North American continent. The bird reminded me of my youth when Reiche, in Alfeld (Hannover), bought up sparrows for shipment to the United States, where they now flourish to such an extent that they are a nuisance in many places. I was interested to know what flea occurred in its nest, hoping that the sparrow either had picked up an American bird-flea, or had brought its own flea over from Europe. But in the nests I took at Braewold I found only the hen-flea and this in numbers. The occurrence of the Old World hen-flea in the Atlantic States and its absence from the Pacific side of the Continent, where fowls are infested with another flea, is one of the puzzles we cannot as yet explain. The distribution of the human flea in the States is somewhat similar, *Pulex irritans* being practically unknown in the Eastern States and common in the south and west.

The experience gained on the Potomac and at Mt. Kisco stood me in good stead when I arrived, towards the end of June, at the Rolling Rock Club, Ligonier, Pa., where my kind and most helpful friend Dr. W. J. Holland introduced me after I had finished studying, in the Carnegie Museum at Pittsburgh, some special questions of taxonomy in the large collection of Lepidoptera for which that Museum is renowned among Entomologists. I stayed at the Rolling Rock Club for nearly a fortnight; it is a delightful place where I could devote all my time to rambles in the extensive woods and to trapping and insect-collecting. I shall always be grateful to my host, Mr. R. B. Mellon, for giving me this opportunity to study life in the Alleghany Mountains under the most comfortable and favourable conditions imaginable. The woods run right up to the house and teem with small mammals, birds and insects. Here the Red and Grey Squirrels, the Opossum, Brewer's Mole, the Short-tailed Shrew, Chipmunk, Woodchuck and Cotton-tail Rabbit, and the White-footed Mouse can be encountered a few yards from the door, and farther afield the Packrat occurs under disused barns and among rocks, the Skunk and Red-backed Woodmouse are in

evidence, and, if one is lucky, even a Rattlesnake may be met with in the open places in the woods. I am certain that more species of mice occur in this district of the Alleghanies than I obtained during my stay ; but the discovery of the whereabouts of small mammals with a restricted distribution requires a longer time than was at my disposal. The staff of the house and estate gave me much help in my pursuits, and particular thanks are due from me to the game-warden, who was untiring in assisting me.

As is so often the case with good things, there was one flaw inimical to making a collection of the fleas occurring on the bigger mammals: it was evidently not the right season for certain species, for there were but two 'squirrel-fleas on the half-dozen *Marmota monax* I examined ; the raccoon, caught in a trap, searched under chloroform and then liberated, only yielded the same common squirrel flea, and the foxes which were kept in an enclosure had no fleas on them, only one larva being the result of the hunt, this larva being found in sacking on which a young fox had been sleeping. The kennels, where I hoped to find either the Dog- or the Cat-flea, were very disappointing : they were kept so clean and well disinfected that fleas had no chance whatever, and even a tame barn-eat was found to be devoid of the usual live-stock. Two Opossums caught in the wood near the house aroused great expectations in me : no Opossum-flea being known from North America I hoped to make a good find. The Opossum offers no opposition to scientific investigations, even if they tend to support the theory of Evolution ; but it puts out its tongue at you. The animal can be handled as if it were a dead specimen. I searched the two Opossums carefully again and again and only had six fleas as a reward of this labour ; one specimen was the Woodchuck-flea, the only example I obtained of this common species during my visit, two were the common Squirrel-flea, two others the flea of the White-footed Mouse, and the sixth example was a new Mouse-flea which the Opossum probably had picked up when eating a mouse or grubbing for insects. I think the fall would be a better season for some of the mammal-fleas than the summer. A number of abandoned bird-nests examined at the Rolling Rock Club proved a failure, whereas fleas were fairly plentiful on mice and shrews ; the best species among them was a small series of *Leptopsylla hesperomys*, which was but poorly represented in the collection at home. The *Blarina*-flea was not rare, and as I had already obtained a series of it on the Potomac and at Mt. Kisco its capture was apt to leave me cold. The *Blarina* is a carnivorous, fierce little beast ; I was shown a quite young rabbit whose ears had been partially eaten, and on putting a trap in the nest I caught a *Blarina*, which had evidently been the culprit.

It was no merit of my own that I was luckier with bird-fleas at Cohasset, Boston, Mass., where I stayed with my friend Mr. B. Preston Clark in his beautiful home, situated on the rocky shore of the Atlantic. Mr. Clark's daughter and her husband are much interested in birds, and when I mentioned that we knew very few bird-fleas from North America, Mrs. K. C. Harding suggested that we might find something I wanted in the old nests contained in the nesting boxes set up in the garden. And here indeed we obtained the nest of the White-footed Mouse, full of fleas, cocoons and larvae, and in another box a quantity of a bird-flea only known from far-away British Columbia. Soon after my arrival in England Mrs. Harding sent me several tubes with fleas, one tube containing a species which I at first took to be new, but afterwards found to be described

from a single specimen, and this again from British Columbia. This species is a very interesting find, and as there are nearly fifty specimens, there are enough for a number of laboratories where Ectoparasites are being studied. The material of bird-fleas which we owe to Mrs. K. C. Harding is a most successful and welcome contribution to our knowledge of these blood-sucking insects, for which all who are interested in this particular line of research, a branch of Medical Entomology, will be grateful. In Mrs. Preston Clark's garden we also found the Meadow Mouse and the Short-tailed Shrew, and one of the species of flea (No. 11) obtained I had not previously collected.

And now a few days in New York and then back to England.

The number of species of fleas I found is small, as is natural on a rapid visit during which one is bound to collect the same species over and over again. But I had nevertheless accomplished what I wanted: to become familiar with the commoner species, their hosts and haunts, and thus to shed to some extent the dry shell of the laboratory entomologist.

1. *Cediopsylla simplex* Baker (1895).

East Falls Church, Va., bred in numbers in June from a newly abandoned nest of *Sylvilagus floridanus mallurus* which Dr. E. A. Chapin kindly obtained for me.

2. *Ceratophyllus gallinae* Schrank (1803).

Mt. Kisko, N.Y., June, in nests of *Passer domesticus* L. (1758), 35 specimens.

Babson's Park, Mass., July, in nests of *Sialia sialis sialis* and *Iridoprocne bicolor*, 16 specimens collected by L. W. Smith, communicated by Mrs. K. C. Harding.

Probably a flea introduced from Europe with Domestic Fowl, but we cannot yet be sure. It is possible that the species is an indigenous one on some wild birds, such as *Parus*. Further investigation is necessary, in Europe as well as America, and above all in India.

3. *Ceratophyllus diffinis* Jord. (1925) (text-fig. 7).

Cohasset, Boston, Mass., August, in nest of *Galeoscoptes carolinensis*, 47 specimens, Mrs. K. C. Harding coll.

I described this species in Nov. Zool. xxxii, p. 111 (1925) from a single male obtained by Mr. Garrett at Okanagan Falls, British Columbia, on *Colymbus holboelli*. The present long series confirms my statement that the species is closely related to *C. garei* Roths. (1902). The hitherto unknown female is easily recognised by the seventh abdominal sternite and the spermatheca, which we figure. The apical margin of the seventh sternite (VII. st.) is more or less evenly incurved, the upper and lower lobes being about equal in size in lateral aspect. The spermatheca (R.s.) is similar to that of *C. garei*, but its tail is longer. In *C. diffinis*, *C. garei* and some other bird-fleas the proximal portion of the duct of the spermatheca is not strongly chitinised as it is in the species with a long spermatheca of the *C. gallinae*-type.

4. *Ceratophyllus idius* J. & R. (1920).

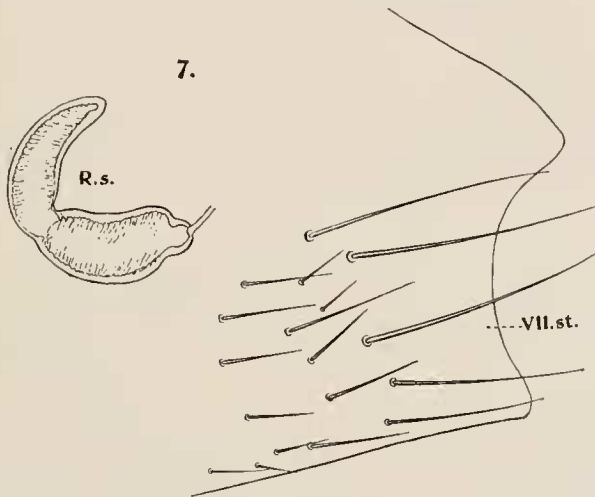
Cohasset, Boston, Mass., July–August, in nest of *Troglodytes aedon aedon*; 41 specimens.

Rock, Mass., July, in nest of *Sialia sialis sialis*, A. W. Higgins coll.

Babson's Park, Mass., in nest of *Iridoprocne bicolor*, L. W. Smith coll.

These three lots I owe to Mrs. K. C. Harding's kind collaboration. Originally described from a small series off *Iridoprocne bicolor* obtained at Okanagan Landing, British Columbia, by J. A. Munro. The seventh sternite is deeply sinuate, the lobe above the sinus being more or less pointed, but variable in length.

I expected to find some subspecific difference between the specimens from Massachusetts and British Columbia, but the examples from these widely separated countries are alike, apart from individual variability.



5. *Ceratophyllus fasciatus* Bosc (1801).

Rolling Rock Club, Ligonier, Pa., 29 June, on *Neotoma pennsylvanica*, one ♂.

Cohasset, Boston, Mass., 4 July, off *Peromyscus leucopus*, one ♀.

This cosmopolitan rat-flea occurs sparsely in the Eastern States; it is commoner in California. It has received several names, as will be pointed out another time when dealing with the synonymy of the American fleas.

6. *Ceratophyllus arctomys* Baker (1904).

Rolling Rock Club, Ligonier, Pa., 28 June, on Opossum; one ♂.

7. *Ceratophyllus wickhami* Baker (1895).

Rolling Rock Club, 25 June, on *Marmota monax*, 2♀♀; 26 June, on *Procyon lotor*, one ♂; 1 July, on *Sciurus hudsonius loquax*, 12 specimens; 2 July, on *Tamias striatus*, one ♂, and on Opossum, 2♂♂.

A very common Squirrel-flea, which has been introduced into England with

the Gray Squirrel. There is a very interesting pathological specimen among the series taken off the Red Squirrel. The mesonotum of this specimen bears on the left side at the lower angle two broad spines recalling the spines of the prothoracic comb, but narrower and shorter, and below these spines a longer bristle-like spine; the longitudinal ventral inerassation of the mesonotum extends to the base of these abnormal spines, while on the other side of the body the inerassation fades away in the middle of the segment as in normal specimens. What is the meaning of these spines? Nearly all fleas, with the exception of the family *Pulicidae* (cf. Verhändl. III. Internat. Ent.-Kongress. p. 601, 1926) bear, on the under surface of the apical mesonotal area which overlaps the metanotum, a row of bristle-like projections, variable in number and distant from the apical margin of the segment. These false bristles I consider to be homologous to the spines of the combs. In the specimen under discussion two of these "false bristles" have not been arrested in their development when they reached the normal size, but have gone on beyond that stage, a mechanical interference with the normal process of growth probably being the cause of this abnormal development. The apical margin of the segment turns frontal above the spines, as if the lower portion of the apical area were used up in the development of the spines. We find this phenomenon similarly illustrated in a large number of species which bear apical spines on the tergites, the marginal area of the segments being reduced in length (excised) wherever there is a spine.

8. *Ceratophyllus sexdentatus pennsylvanicus* sp. nov. (text-figs. 8, 9).

Represents *C. sexdentatus* Baker (1904) in the Atlantic States. Chaetotaxy similar. Occiput with the median bristle not accompanied by a smaller bristle, in which character the new species agrees with all the subspecies of *C. sexdentatus* Baker (1904).

♂. Manubrium (M) of clasper shorter than in *C. sexdentatus agilis* Roths. (1905); process P long, symmetrically rounded at apex; exopodite F usually with 5 spines, sometimes with 4, the distance of the lowest spine from the extreme base of F much longer than its distance from the apical angle of F. The proximal lobe of sternite IX, which bears a short spine, much less expanded in a longitudinal direction than in *C. sexdentatus agilis*; the apical lobe of IX st. is strongly curved down, much more so than in *C. sexdentatus agilis*, but not subtruncate, as it is in *C. sexdentatus sexdentatus*.

♀. Sternite VII (text-fig. 9) deeply divided into two lobes, the upper one always long and apically enlarged, but variable in outline. On the wide ventral portion of tergite VIII 11 or 12 bristles on the outer surface inclusive of the marginal ones, no bristles along the internal inerassation which extends obliquely dorsad-frontad from the median ventral bristles.

Below Black Pool, Potomae R., Va., May, on *Neotoma pennsylvanica*, 22 specimens.

Rolling Rock Club, Ligonier, Pa., end of June, on the same host, 46 specimens, incl. of type.

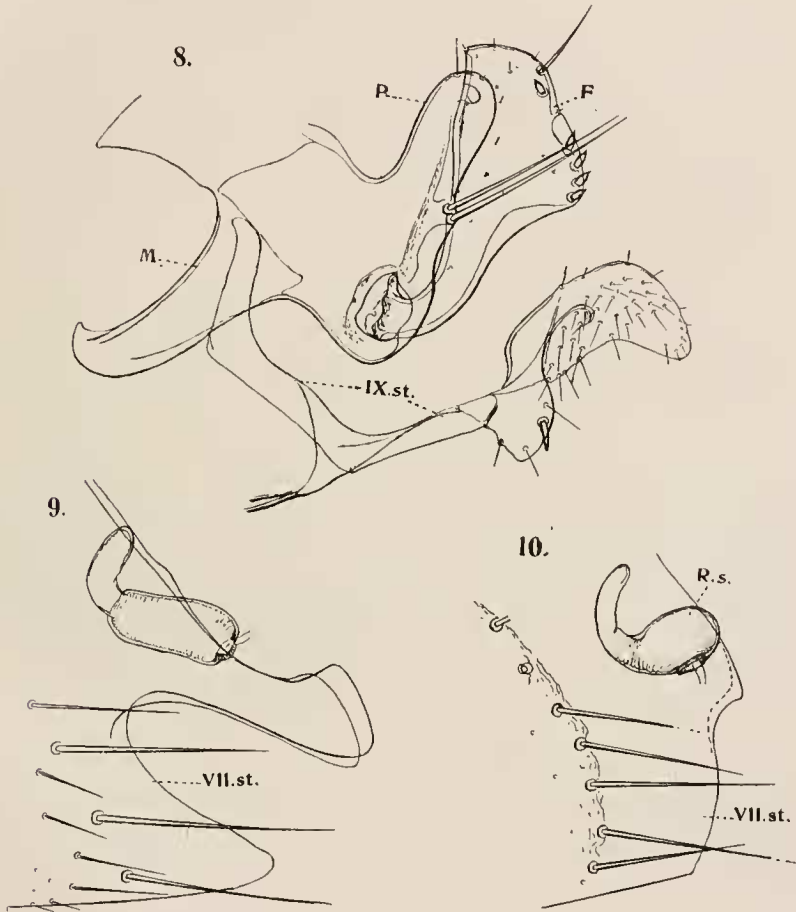
This subspecies probably occurs wherever *N. pennsylvanica* is found. The true hosts of the various other subspecies of *C. sexdentatus*, which are known to occur from Colorado north- and westward, are also forms of *Neotoma*, though the flea has been found on other mammals as well.

9. *Ceratophyllus leucopus* Baker (1904).

The commonest mouse-flea in the Atlantic States. Its true host is *Peromyscus leucopus*.

Plummer's Island, Md., and below Black Pond, Potomac R., Va., May, on *Peromyscus leucopus* and in its nest, 45 specimens and some larvae.

Braewold, Mt. Kisco, N.Y., June, on the same host, 6 specimens.



Rolling Rock Club, Ligonier, Pa., June and July, on the same host, 17 specimens, and on Opossum, 2 July, 2 ♀♀.

Cohasset, Boston, Mass., July, on *P. leucopus* and in its nest, 51 specimens and larvae.

10. *Odontopsyllus multispinosus* Baker (1898).

East Falls Church, Va., May, in a recently abandoned nest of *Sylvilagus floridanus mallurus* given to me by Dr. E. A. Chapin, one ♀, which I put into the nest, optimistically hoping that it would produce a good crop of offspring: the specimen died and got lost in the nest.

11. *Ctenophthalmus pseudagyrtes* Baker (1904).

Common on Moles and Arvicolid Mice, accidentally on other mammals.

Plummer's Island, Potomac R., Md., May, on *Pitymys pinetorum* and in its nest, 28 specimens.

Below Black Pond, Potomac R., Va., May, in nest of *Peromyscus leucopus*, one ♀.

Cheyney, Philadelphia, Pa., June, on *Scalops aquaticus*, 14.

Braewold, Mt. Kisco, N.Y., June on *Microtus pennsylvanicus*, 13 specimens, and on *Blarina brevicauda*, 2♀♀.

Rolling Rock Club, Ligonier, Pa., end of June and early July, on *Parascalops breweri*, 16 specimens; on *Mus musculus*, one ♀; on *Erotomys gapperi*, one ♀; on *Blarina brevicauda*, 13 specimens; on *Neotoma pennsylvanica*, one ♂.

Cincinnati, Ohio, June, on *Scalops aquaticus*, 11 specimens.

Cohasset, Boston, Mass., July, on *Blarina brevicauda*, 5 specimens, and on *Microtus pennsylvanicus*, one ♀.

12. *Neopsylla wenmanni* Roths. (1904).

Cohasset, Boston, Mass., July, on *Peromyscus leucopus*, 2♀♀.

13. *Doratopsylla blarinae* Fox (1914).

The species is nearest to the European *D. cuspis* Roths. (1915). Evidently common.

Below Black Pond, Potomac R., Va., May, on *Blarina brevicauda*, 8 specimens.

Braewold, Mt. Kisco, June, on the same host, 15 specimens.

Rolling Rock Club, Ligonier, Pa., on the same host, 15 specimens: on *Mus musculus*, one ♂; on *Peromyscus leucopus*, one ♂.

Cohasset, Boston, Mass., July, on *Blarina brevicauda*, one ♂.

14. *Leptopsylla hesperomys* Baker (1904).

Rolling Rock Club, Ligonier, Pa., 28 June and 2 July, on *Peromyscus leucopus*, 2♂♂ and 4♀♀.

This small series is most welcome, as we have only two specimens in the collection.

15. *Leptopsylla catatina* sp. nov. (text-fig. 10).

♀. Near *L. selenis* Roths. (1906). Two genal spines, of which the upper extends further distad than the lower. Pronotal comb with 27 spines. On metanotum and abdominal tergites I to VI the following spines on the two sides together: 5, 7, 8, 6, 5, 4. Four antepygial bristles. Sternite VII (text-fig. 10) truncate, with a small sinus below the upper angle, the angle projecting as a short lobe, which is more rounded on one side than on the other, as indicated in the figure; the margin below the sinus slightly convex. Stylet as in *L. selenis*. Head of spermatheca (R.s.) less elliptical than in *L. selenis*.

Rolling Rock Club, Ligonier, 28 June, on *Didelphis virginiana*, one ♀.

16. *Myodopsylla insignis* Roths. (1903).

Rolling Rock Club, Ligonier, Pa., end of June, on *Myotis lucifugus*, 18 specimens.

1. MAMMALS.

 No. of
Fleas.

1. *Didelphis virginiana* Kerr (1792).
 - Ceratophyllus leucopus* Baker (1904) 2
 - Ceratophyllus arctomys* Baker (1904) 1
 - Ceratophyllus wickhami* Baker (1895) 2
 - Leptopsylla catatina* n.sp. 1
2. *Sylvilagus floridanus mallurus* Thomas (1898).
 - Cediopsylla simplex* Baker (1895), in nest 223
 - Odontopsyllus multispinosus* Baker (1898), in nest 1
3. *Evotomys gapperi* Vigors (1830).
 - Ctenophthalmus pseudagyrtis* Baker (1904) 1
4. *Microtus pennsylvanicus* Ord (1815).
 - Ctenophthalmus pseudagyrtis* Baker (1904) 14
5. *Pitymys pinetorum* Le Conte (1829).
 - Ctenophthalmus pseudagyrtis* Baker (1904) 28
6. *Neotoma pennsylvannica* Stone (1893).
 - Ceratophyllus sexdentatus pennsylvanicus* n.subsp. 68
 - Ceratophyllus fasciatus* Bosc (1801) 1
 - Ctenophthalmus pseudagyrtis* Baker (1904) 1
7. *Peromyscus leucopus* Rafin. (1818).
 - Ceratophyllus fasciatus* Bosc (1801) 1
 - Ceratophyllus leucopus* Baker (1904), also in nests 119
 - Ctenophthalmus pseudagyrtis* Baker (1904) 1
 - Neopsylla wenmanni* Roths. (1904) 2
 - Doratopsylla blarinae* Fox (1914) 1
 - Leptopsylla hesperomys* Baker (1904) 6
8. *Mus musculus* L. (1758).
 - Ctenophthalmus pseudagyrtis* Baker (1904) 1
 - Doratopsylla blarinae* Fox (1914) 1
9. *Marmota monax* L. (1758).
 - Ceratophyllus wickhami* Baker (1895) 2
10. *Tamias striatus* L. (1758).
 - Ceratophyllus wickhami* Baker (1895) 1
11. *Sciurus hudsonius loquax* Bangs (1896).
 - Ceratophyllus wickhami* Baker (1895) 12
12. *Blarina brevicauda* Say (1823).
 - Ctenophthalmus pseudagyrtis* Baker (1904) 20
 - Doratopsylla blarinae* Fox (1914) 39
13. *Scalops aquaticus* L. (1758).
 - Ctenophthalmus pseudagyrtis* Baker (1904) 25
14. *Parascalops breweri* Bachm. (1842).
 - Ctenophthalmus pseudagyrtis* Baker (1904) 16
15. *Condylura cristata* L. (1758).
 - No fleas found

	No. of Fleas.
16. Myotis lucifugus Le Conte (1831).	
<i>Myodopsylla insignis</i> Roths. (1903)	18
17. Vespertilio fuscus Beauv. (1796).	
No fleas found	
18. Mephitis putida Cuvier (1798).	
No fleas found	
19. Procyon lotor L. (1766).	
<i>Ceratophyllus wickhami</i> Baker (1895)	1
20. Vulpes fulva Desm. (1820).	
No fleas found	
21. Urocyon cinereoargenteus Mill. (1776).	
No fleas found	

II. BIRDS' NESTS.

1. Troglodytes aedon aedon Vieill. (1807).	
<i>Ceratophyllus idius</i> J. & R. (1920)	41
2. Iridoprocne bicolor Vieill. (1807).	
<i>Ceratophyllus idius</i> J. & R. (1920)	2
<i>Ceratophyllus gallinae</i> Sehrank (1803)	2
3. Galeoscoptes carolinensis L. (1766).	
<i>Ceratophyllus diffinis</i> Jord. (1925)	47
4. Sialia sialis sialis L. (1758).	
<i>Ceratophyllus gallinae</i> Sehrank (1803)	14
<i>Ceratophyllus idius</i> J. & R. (1920)	20
5. Passer domesticus L. (1758).	
<i>Ceratophyllus gallinae</i> Sehrank (1803)	35

